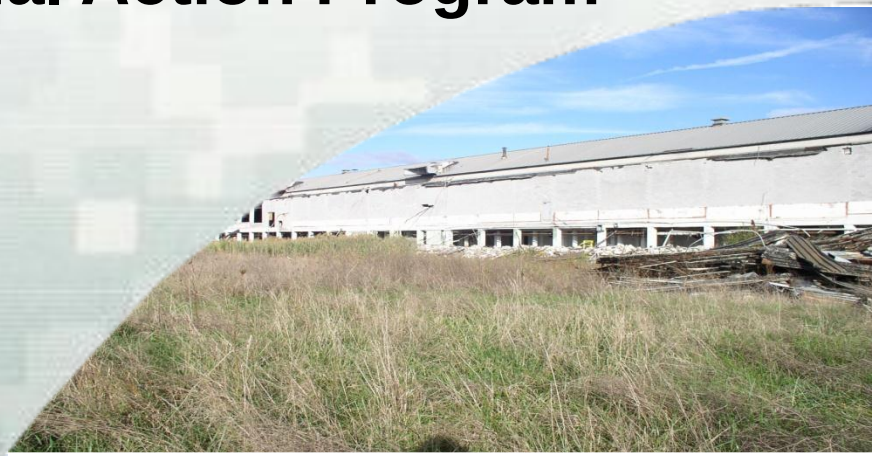
Luckey Ohio Project Site

Formerly Utilized Sites Remedial Action Program (FUSRAP)



Beryllium Health and Safety Committee
Spring 2013 Meeting
Oak Ridge Associated Universities

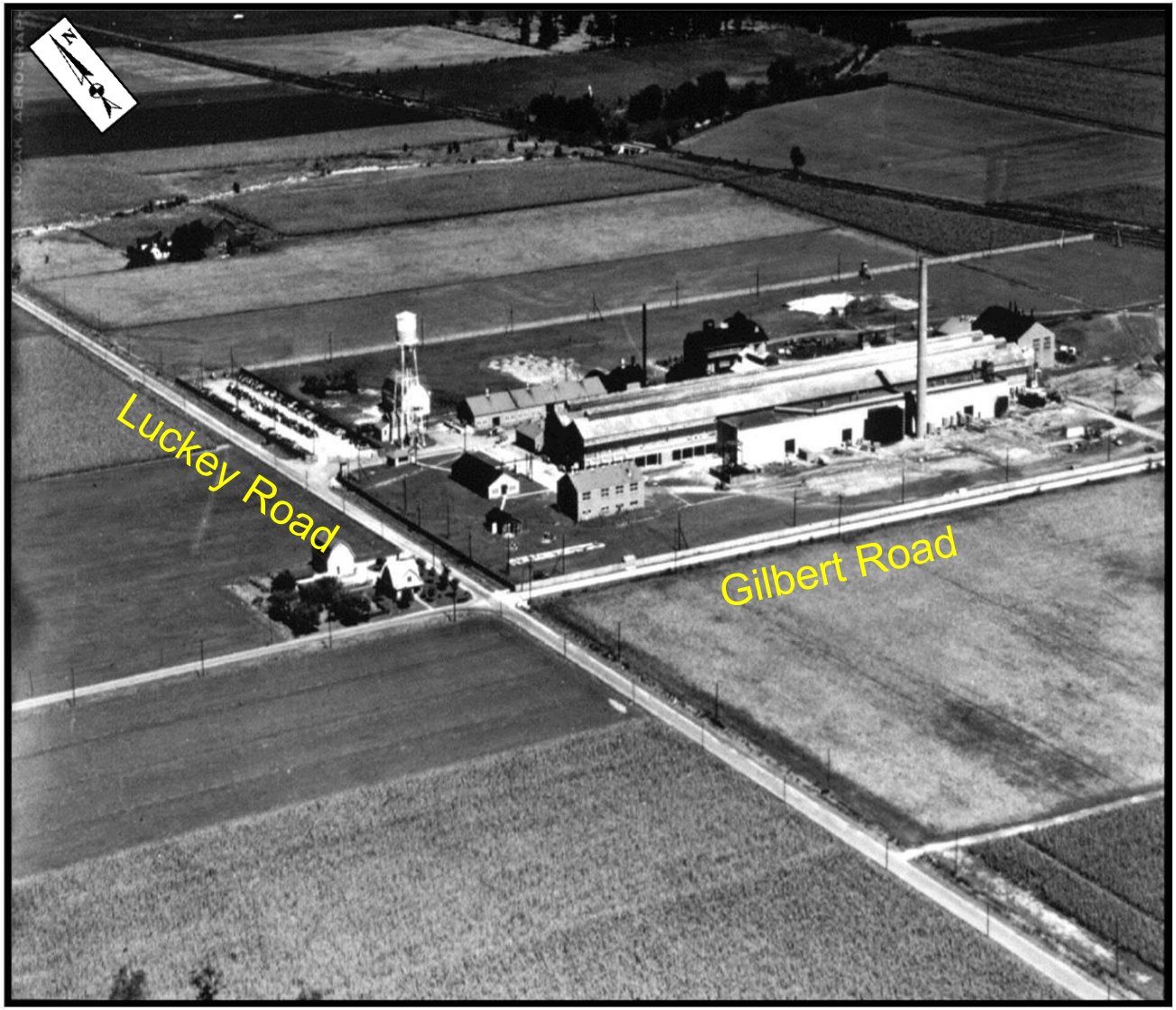
Karen G. Keil
USACE Buffalo District

US Army Corps of Engineers
BUILDING STRONG®

Presentation Overview

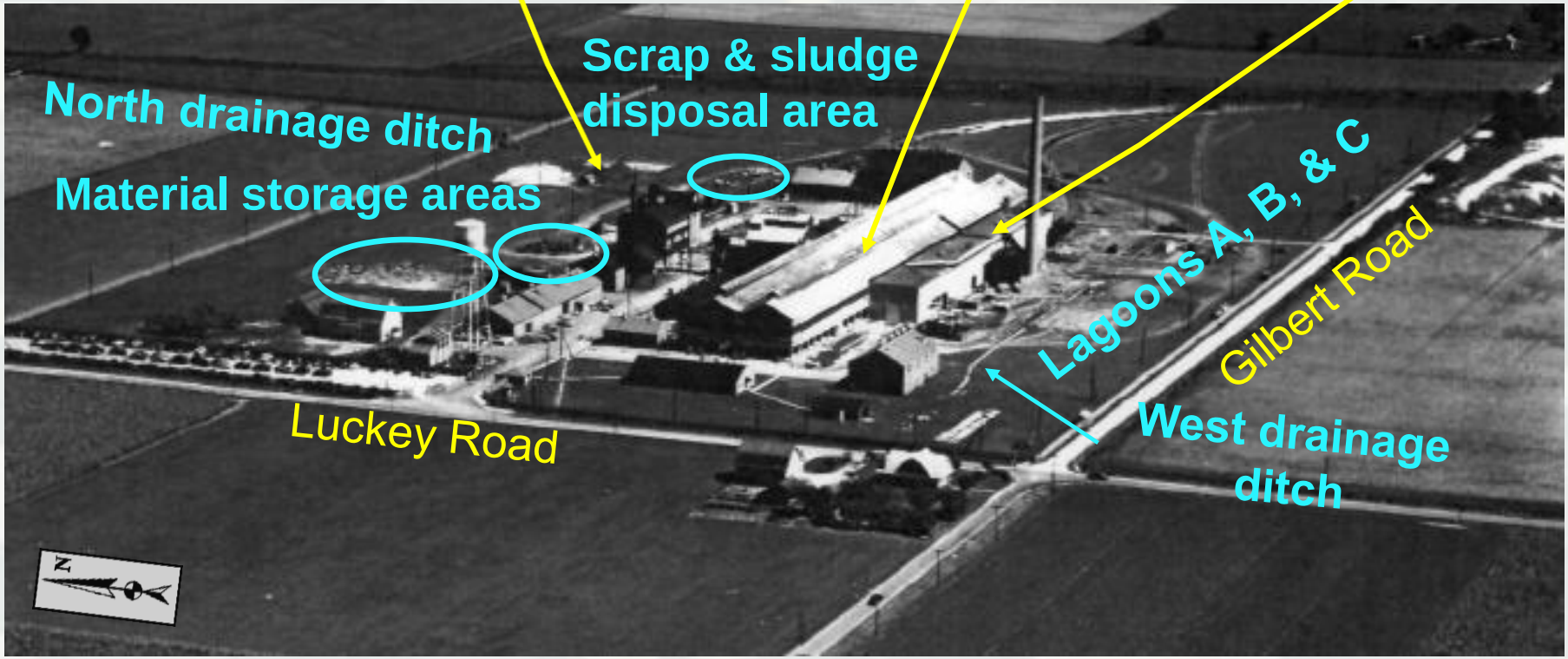
- Site and Project History
- Nature and Extent of Contamination
  - Groundwater
  - Soil
  - (buildings)
- FUSRAP Remedial Action Plans
- Buffalo District questions for the BHSC

Luckey Site circa 1950's

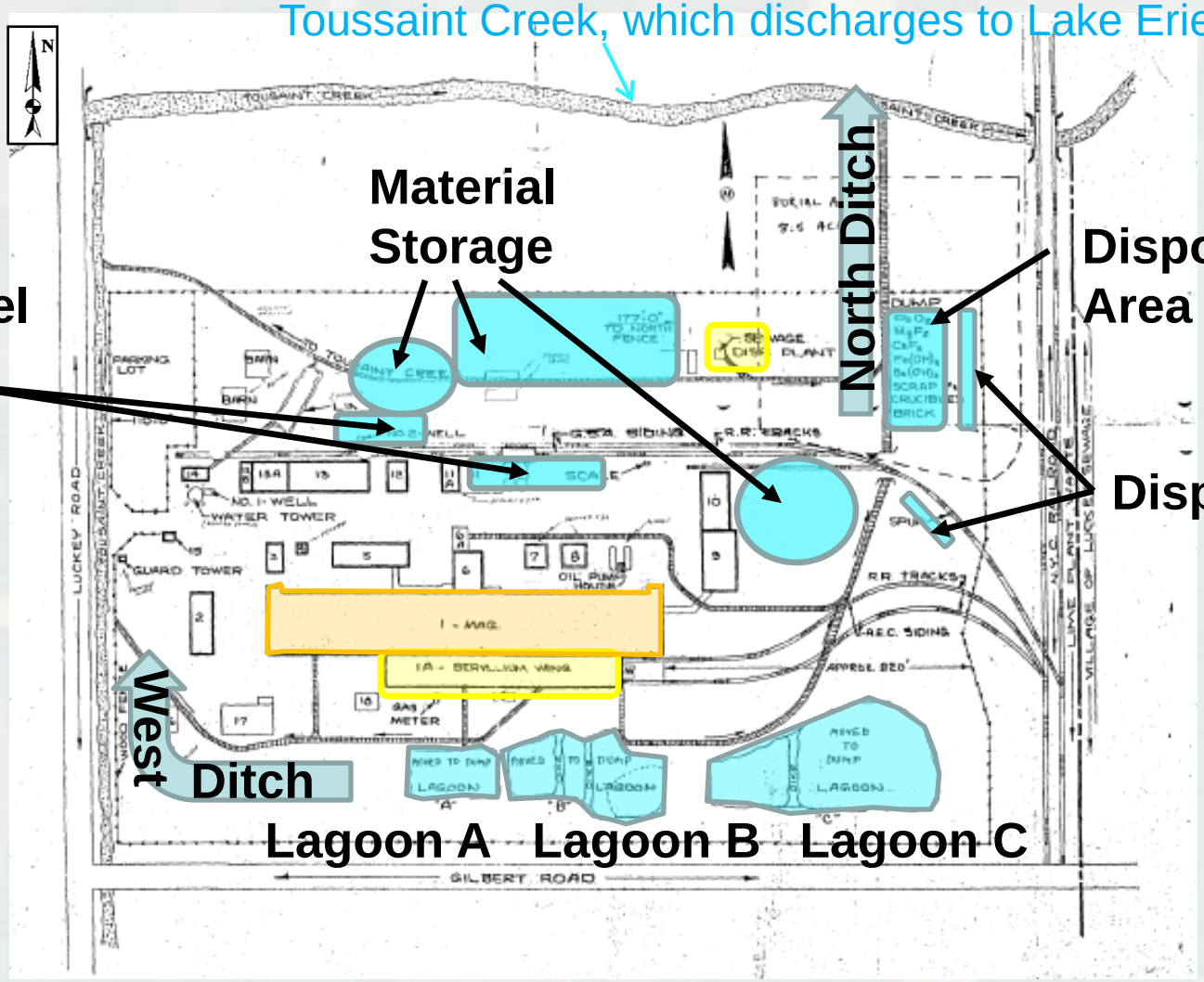


Oblique Aerial Photo

(Date Unknown)

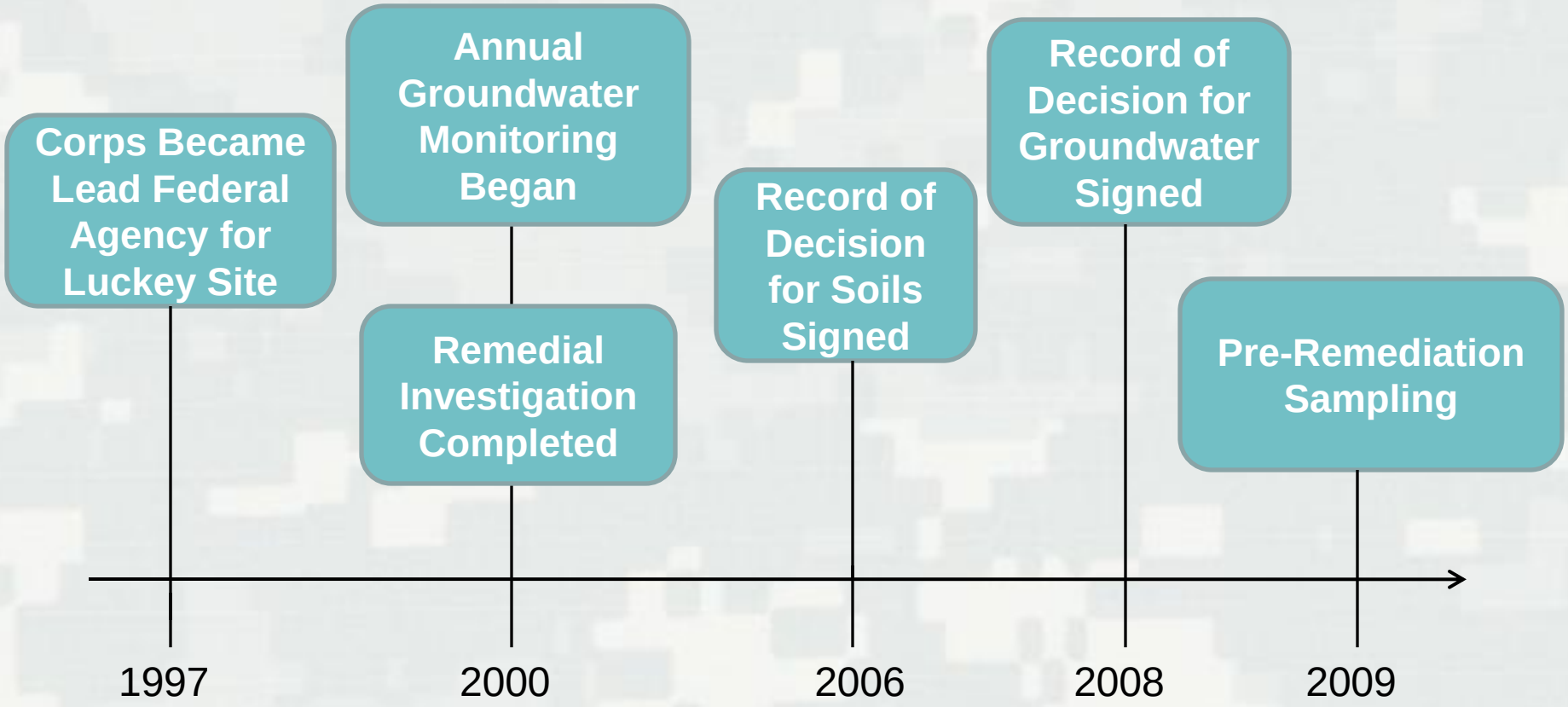


Luckey Site Drawing – 1956



Luckey Site Status July 2010:
Location of former Production and Annex Buildings

Corps Activities at Luckey



Summary Statistics for Soil Contaminants

Parameter	Detection Frequency	Minimum Value	Maximum Value	Average Value	Background	Background Exceed	CG*	CG** Comp Value	CG Exceed	Units
Metals										
Beryllium	902/903	0.07 B	13300	227.96	1.13	547/902	131	131	126/902	mg/kg
Lead	437/438	1.1	28900 J	198.88	23.2	174/437	400	400	21/437	mg/kg
Radiological Parameters										
Radium-226	476/477	0.0744	4000	17.62	2.97	107/476	2	4.97	94/476	pCi/g
Thorium-230	435/440	0.162 J	88.5	4.27	3.2	66/435	5.8	9.0	45/435	pCi/g
Uranium-234	432/436	0.0967	52.3	2.9	2.61	69/432	26	28.61	6/432	pCi/g
Uranium-238	474/477	0.0977	280	6.85	2.63	107/474	26	28.63	27/474	pCi/g

*CG = Media-specific Cleanup Goal

**CG Comp Value is represented by the sum of the background and CG values for radionuclides

Summary Statistics for Groundwater Contaminants

Parameter	Detection Frequency	Minimum Value	Minimum Location #	Maximum Value	Maximum Location #	Average Value	Background	Background Exceed	MCL ***	MCL Exceed	MCL Exceed / Total Samples (%)	Units
Beryllium	73/291	0.15 B	MW-25(I)	170	MW-26(S)	4.72	0.79	51/73	4	39/73	13.4	µg/L
Beryllium (Filtered)	46/257	0.17 B	MW-24(S)	137	MW-26(S)	3.53	--	46/46	4	21/42	8.2	µg/L
Lead	123/282	1.4 B	MW-19(I)	48.5	MW-21(I)	4.53	7.2	33/123	15	15/123	5.3	µg/L
Lead (Filtered)	86/257	1.5 B	MW-14(S)	46.2	MW-21(I)	3.67	1.8	74/86	15	10/86	3.9	µg/L
Uranium, total *	245/291	0.11	MW-39(B)	389.86	MW-24(S)	11.48	4.23 **	71/245	30	13/245	4.5	µg/L

NOTES:

* Where total uranium values were absent, total uranium values were calculated by using the equation (U-238 value x 2.046/0.677) resulting in a total uranium value in µg/L.

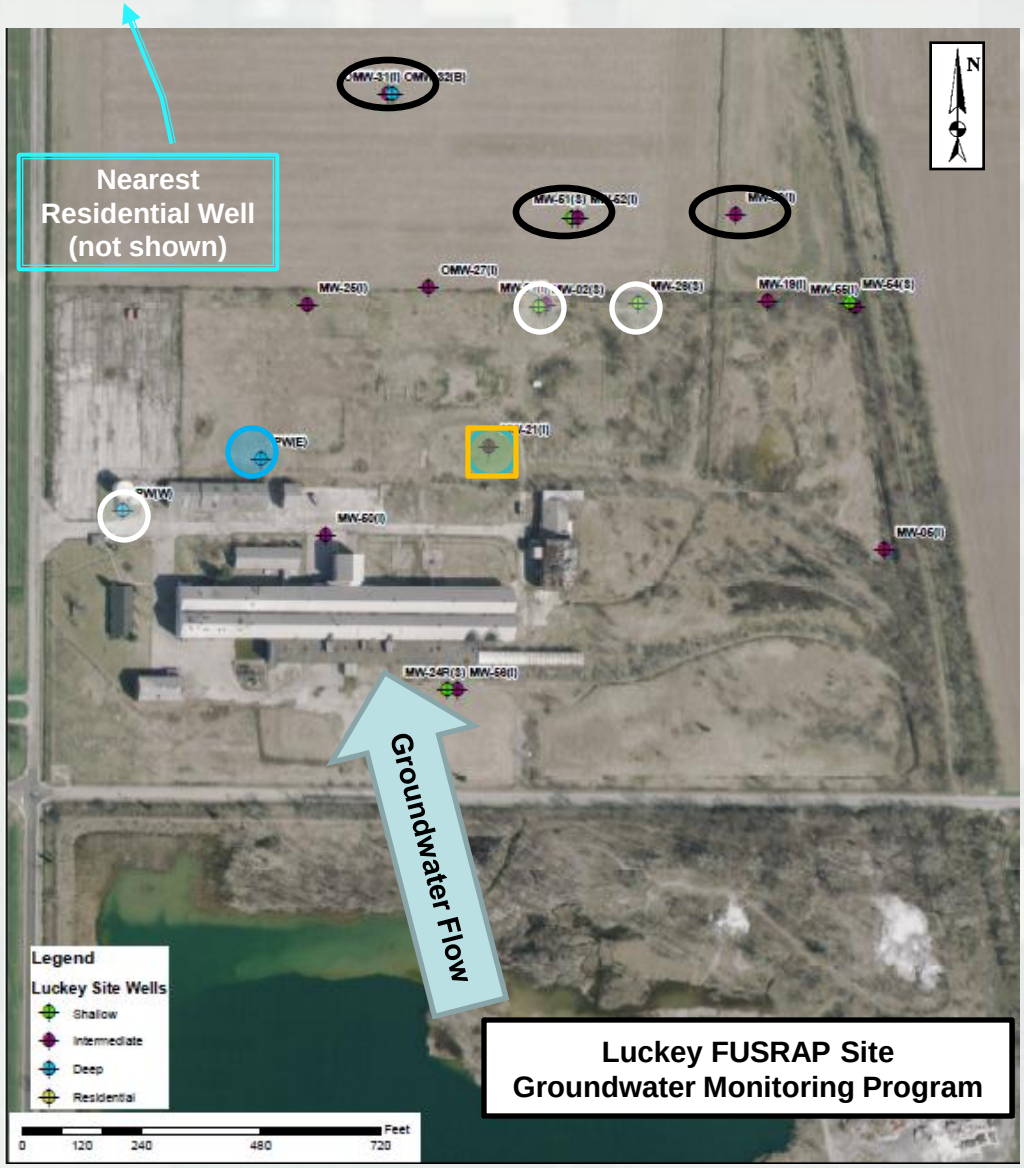
** The total uranium background value was calculated by converting the U-238 background value (1.4 pCi/l) using the equation above.

*** MCL = USEPA Maximum Contamnant Level (ARAR-based cleanup goal) and includes the lead Action Level for treatment.

Well designators: S = Shaloow Zone, I = Intermediate Zone, B = Deep Bedrock Zone

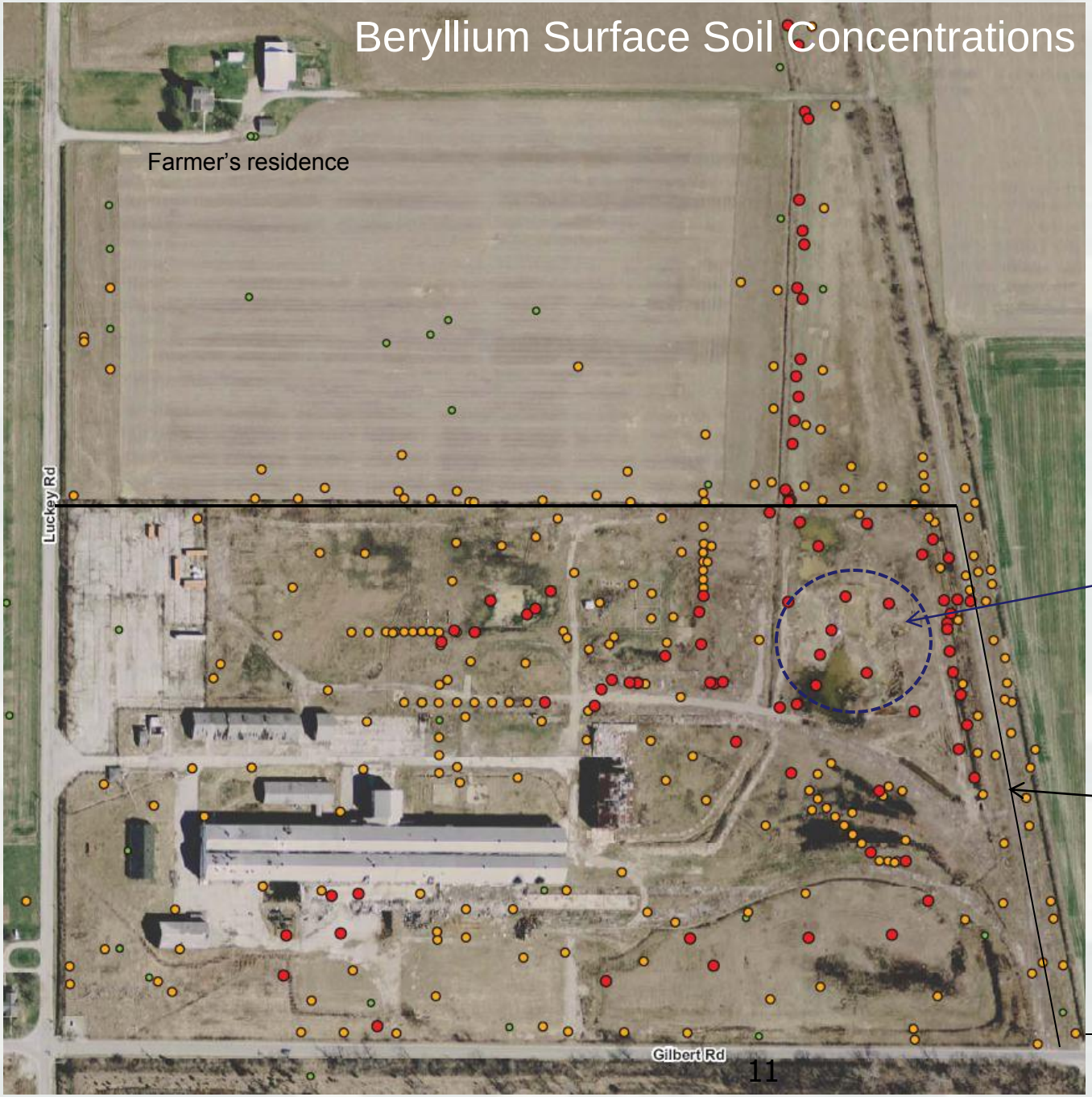
-- Non-Detect

Groundwater Monitoring



- Annual Sampling Program
- 17 to 21 Wells
- Three water bearing zones
- Beryllium, uranium, and lead
- Geochemical analytes
- Verifies minimal transport
- Current conditions protective of groundwater resources
- Groundwater remedy relies on soil Remedial Action

Beryllium Surface Soil Concentrations

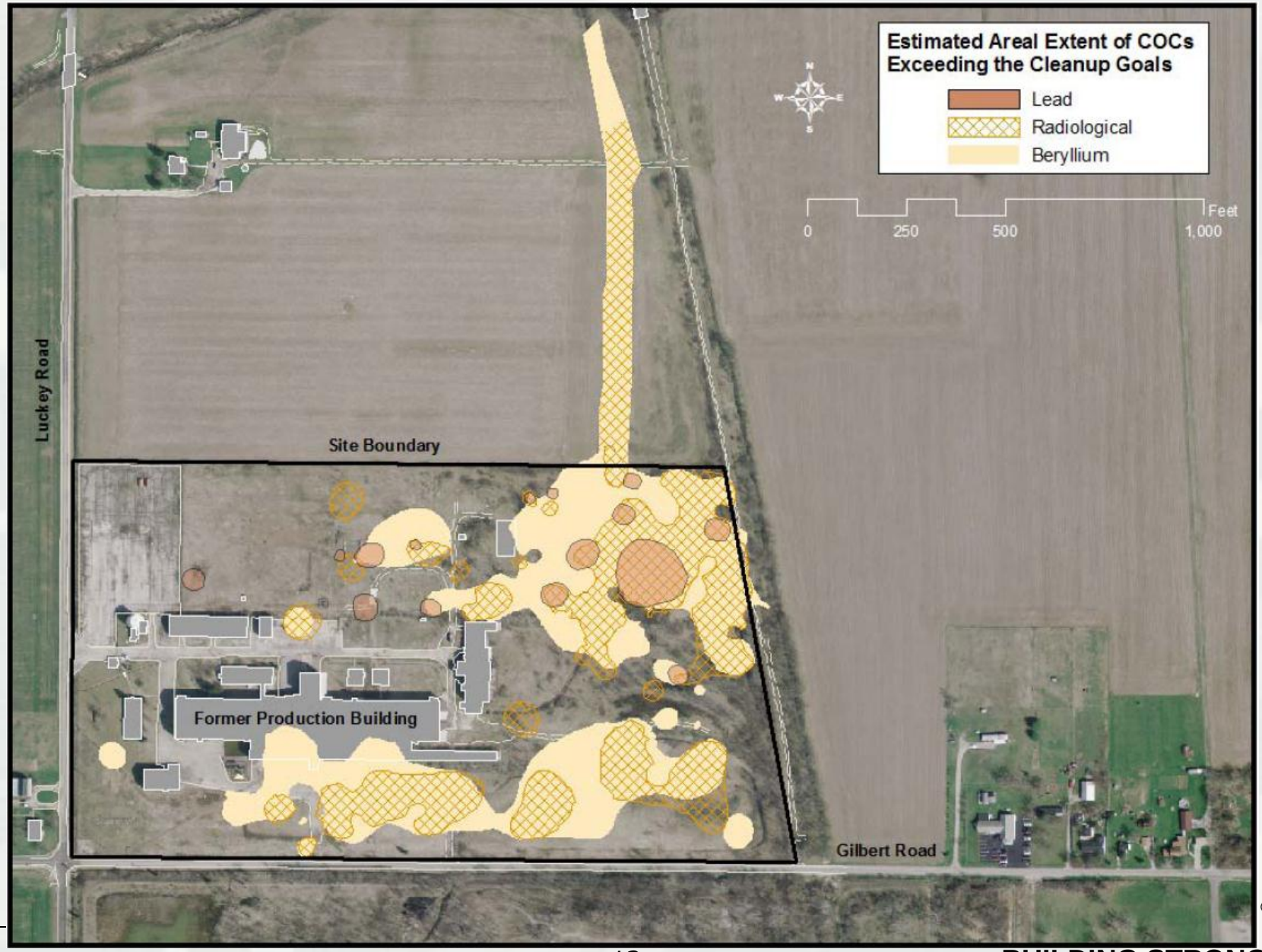


- Be < 1.1 ppm
- Be > 1.1 ppm (below 131)
- Be > 131 ppm

Average beryllium concentration in surface soil in this area is ~ 3,500 mg/kg

Site boundary

FUSRAP-Related Contamination in Soil



Modeled depth of excavations and post-remediation beryllium (residual) concentrations

USACE Remedial Action Plans

1. **CBDPP Development**
2. **Award Scope of Work for Remediation**
3. **Soil excavation**
4. **Building removal if in way of soil contamination**
5. **Groundwater Monitored Natural Attenuation** *(GW monitoring on-going annually, MNA remedy begins after soil removal with on-going monitoring)*
6. **Site turned over to DOE** *(2 years after soil remediation finalized; expect free release of site except for GW monitoring)*

USACE Luckey team questions for the BHSC

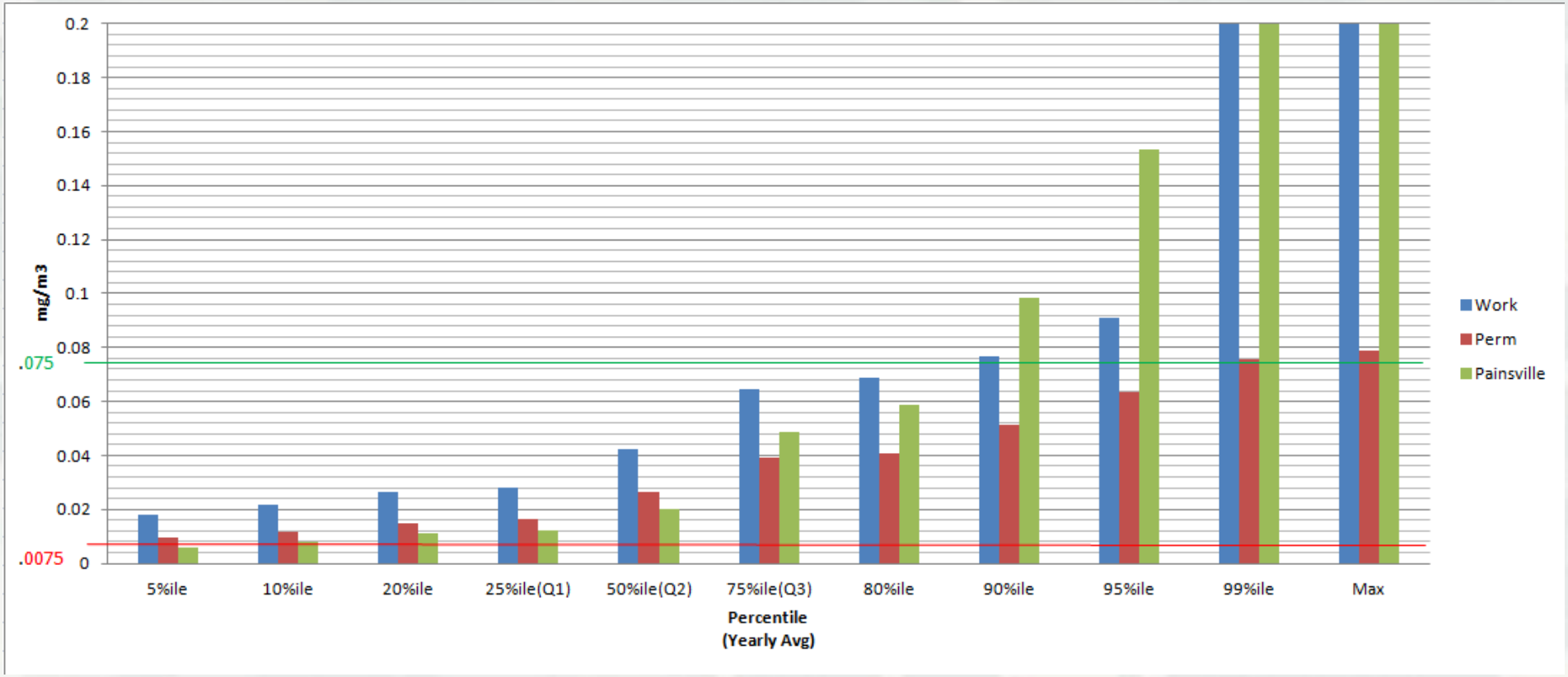
- Does the weathering of beryllium in the environment or presence of soil decrease the toxicity/bioavailability of beryllium significantly?
  - How is particle size affected by presence of soil and/or weathering in the environment?
  - Should we adjust air monitoring techniques for airborne beryllium-contaminated soil, depending on any reduction in bioavailability?

- The entire site has beryllium above background in surface soil,
  - How / Where do we establish remediation support zones?
  - What areas need to be exclusion zones (Be regulated/controlled areas)?

- How to implement a fully protective CBDPP
  - In the absence of 10 CFR 850/851?
  - For remediation (semi-characterized) projects?

Back up slides for possible panel questions

Total particulates generated during soil excavation remediation of other FUSRAP sites



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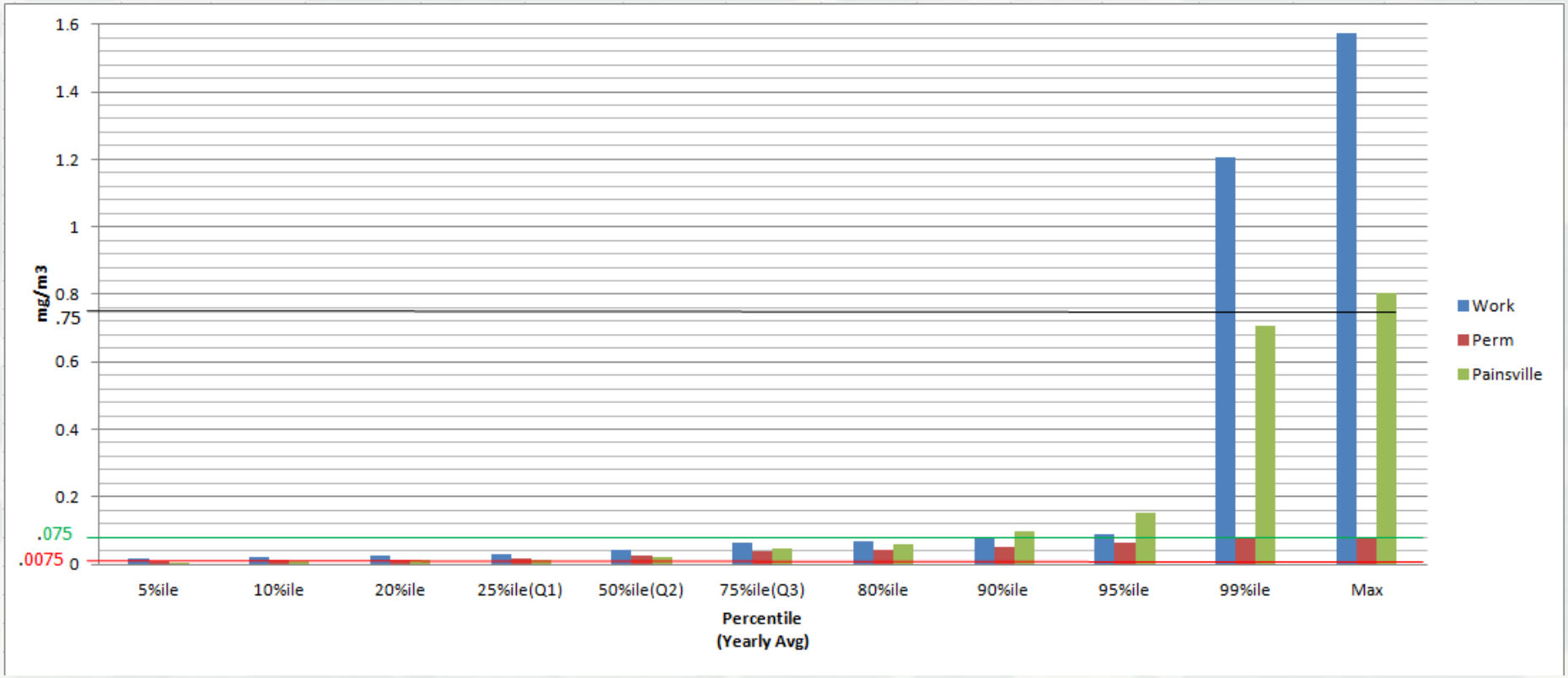
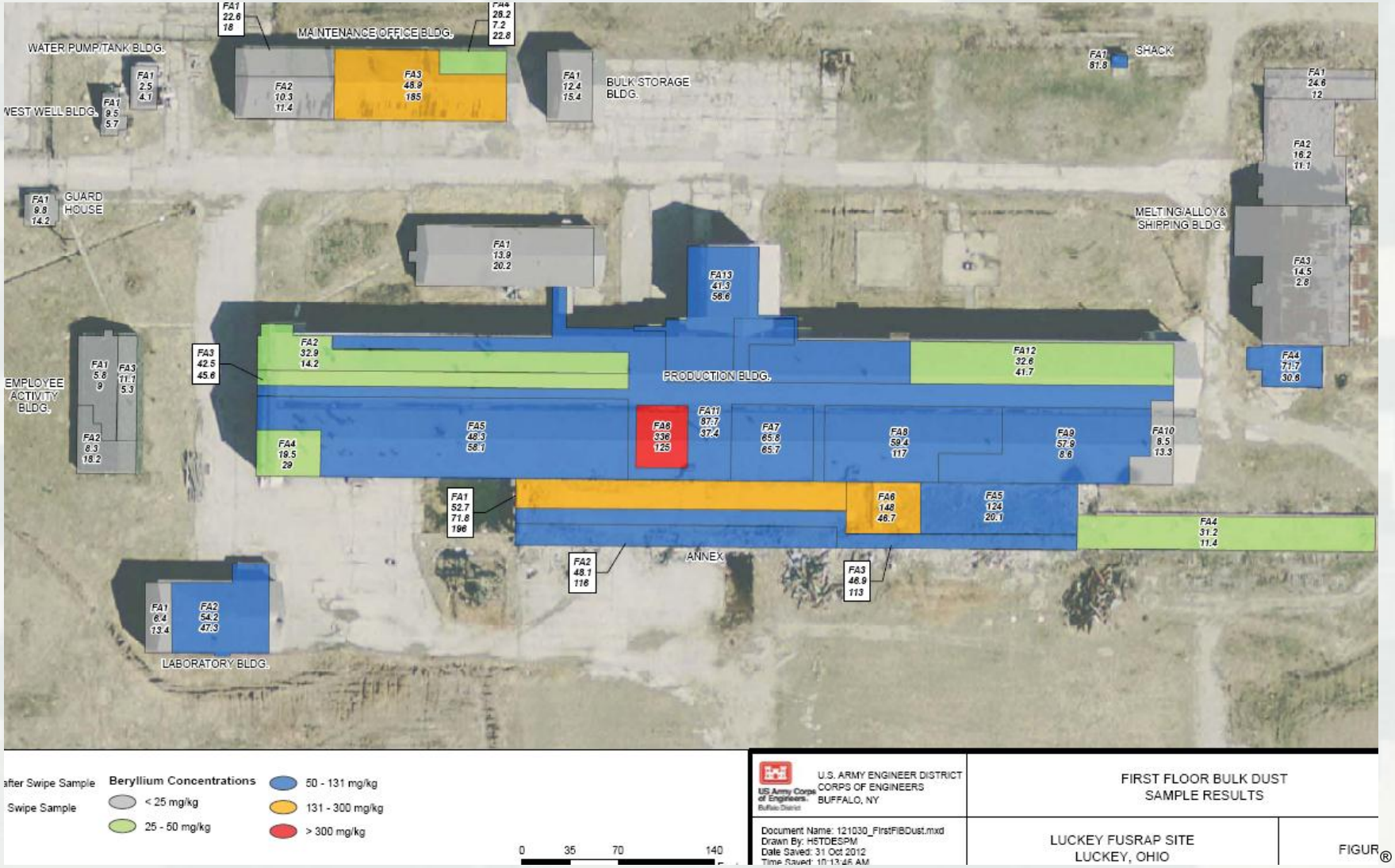


Beryllium Swipe Sample Results in Buildings



Beryllium Bulk Dust Sample Results in Buildings